

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
11 March 2004 (11.03.2004)

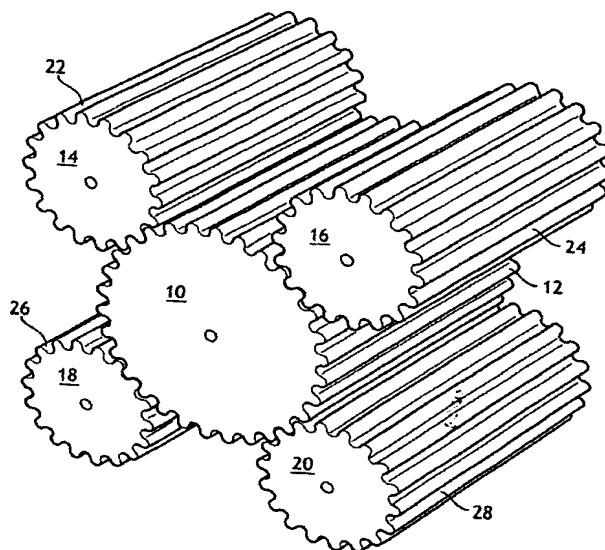
PCT

(10) International Publication Number
WO 2004/020174 A1

- (51) International Patent Classification⁷: **B29C 55/18**
- (21) International Application Number:
PCT/US2003/026247
- (22) International Filing Date: 22 August 2003 (22.08.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/407,172 30 August 2002 (30.08.2002) US
- (71) Applicant: **KIMBERLY-CLARK WORLDWIDE, INC.** [US/US]; 401 N. Lake Street, Neenah, WI 54956 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **GERNDT, Robert, James** [US/US]; 9158 Branch Valley Way, Roswell, GA 30076 (US). **MALDONADO, Jose, Enrique** [US/US]; 212 Magnolia Springs Drive, Canton, GA 30115 (US). **MCCORMACK, Ann, Louise** [US/US]; 1265 Poplar Grove Lane, Cumming, GA 30041 (US). **MORMAN, Michael, Tod** [US/US]; 555 Kings Peak, Alpharetta, GA 30022 (US).
- (74) Agents: **HERRICK, William, D. et al.; KIMBERLY-CLARK WORLDWIDE, INC.**, 401 N. Lake Street, Neenah, WI 54956 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: DEVICE AND PROCESS FOR TREATING FLEXIBLE WEB BY STRETCHING BETWEEN INTERMESHING FORMING SURFACES



(57) Abstract: A series of nips (200, 202, 204, 412, 414) formed by intermeshing grooves (22, 24, 26, 28) provides for a higher degree of stretch, particularly for lightweight webs (100) by stretching in stages in multiple grooved nips. The ability to adjust the degree of stretch at each nip can provide a high degree and variability of stretch with reduced web damage compared to a single step application of the same stretch. Improvements to the manufacture of lightweight components of personal care products such as diaper backing components are obtained.

WO 2004/020174 A1

WO 2004/020174 A1



— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PC 03/26247

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B29C55/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|---|
| X | US 4 806 300 A (MUNCHBACH GEORGE E ET AL) 21 February 1989 (1989-02-21) column 2, line 11 -column 3, line 27 column 2, line 53 -column 4, line 4; figures 1-4 --- | 1,2,5-7, 9-11,13, 15, 18-20,22 |
| X | WO 00 29199 A (KIMBERLY CLARK CO) 25 May 2000 (2000-05-25) page 16, line 34 -page 17, line 2; figures 4-8,15 --- | 1,8,13, 16,17,22 |
| X | DE 25 03 775 A (REIFENHAEUSER KG) 5 August 1976 (1976-08-05) paragraph bridging pages 6 and 7; figure 3 --- | 1,13,22 |
| | -/-- | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

8 January 2004

Date of mailing of the international search report

27/01/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Attalla, G

INTERNATIONAL SEARCH REPORT

International Application No

PCT 03/26247

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | GB 1 526 724 A (RASMUSSEN O) 27 September 1978 (1978-09-27) page 1, line 51 - line 59; figures --- | 1,13,22 |
| X | US 6 355 200 B1 (D' ACCHIOLI VINCENZO ET AL) 12 March 2002 (2002-03-12) column 10, line 4 - line 27 column 11, line 32 - line 44 --- | 1,13,22 |
| X | US 5 143 679 A (WEBER GERALD M ET AL) 1 September 1992 (1992-09-01) column 17, line 58 - line 65; figures 2A-2C ----- | 1,13,22 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC7 03/26247

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|----|---------------------|---|--|
| US 4806300 | A | 21-02-1989 | NONE | |
| WO 0029199 | A | 25-05-2000 | US 6368444 B1 AU 1477400 A BR 9915396 A DE 19983756 T0 GB 2361664 A ,B WO 0029199 A1 | 09-04-2002 05-06-2000 14-08-2001 04-10-2001 31-10-2001 25-05-2000 |
| DE 2503775 | A | 05-08-1976 | DE 2503775 A1 | 05-08-1976 |
| GB 1526724 | A | 27-09-1978 | NONE | |
| US 6355200 | B1 | 12-03-2002 | EP 0810078 A1 AU 3064997 A CA 2256474 A1 JP 2000500712 T KR 2000016103 A WO 9745254 A1 ZA 9704382 A | 03-12-1997 05-01-1998 04-12-1997 25-01-2000 25-03-2000 04-12-1997 23-12-1997 |
| US 5143679 | A | 01-09-1992 | AT 150362 T AU 665755 B2 AU 1556192 A BR 9205693 A CA 2104236 A1 CN 1064240 A ,B CZ 9301754 A3 DE 69218415 D1 DE 69218415 T2 DK 573587 T3 EG 19660 A EP 0573587 A1 ES 2098506 T3 FI 933775 A GR 3022873 T3 HK 1006554 A1 HU 67947 A2 IE 920627 A1 JP 6505446 T KR 239274 B1 MX 9200880 A1 NO 933047 A NZ 241760 A PL 169406 B1 PT 100182 A ,B RU 2098277 C1 SG 54140 A1 SK 91293 A3 TR 27772 A WO 9215445 A1 US 5628741 A | 15-04-1997 18-01-1996 06-10-1992 24-05-1994 29-08-1992 09-09-1992 16-03-1994 24-04-1997 10-07-1997 30-06-1997 30-09-1997 15-12-1993 01-05-1997 27-08-1993 30-06-1997 05-03-1999 29-05-1995 09-09-1992 23-06-1994 15-01-2000 01-09-1992 25-10-1993 27-04-1995 31-07-1996 29-04-1994 10-12-1997 16-11-1998 08-06-1994 09-08-1995 17-09-1992 13-05-1997 |